

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/008710

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C08F210/06 C08F4/642

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C08F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 644 206 A (SHOWA DENKO KK) 22 March 1995 (1995-03-22) examples 1-23 tables 1-4 claims 1-10	1-6,8,9, 17
X	US 2003/092563 A1 (GAO XIAOLIANG ET AL) 15 May 2003 (2003-05-15) examples S1,S2,S6,S8,S11,S13 examples 2,3,15,22,27,31 table 2	1-6,8,9, 17,19,20
X	US 2001/051587 A1 (WILLIAMS DARRYL STEPHEN) 13 December 2001 (2001-12-13) examples 1-12 claims 1-20	1-4,9,17
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

5 August 2005

Date of mailing of the international search report

14. 09. 2005

Name and mailing address of the ISA

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Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>BOTT R K J ET AL: "Monocyclopentadienyl phenoxy-imine and phenoxy-amine complexes of titanium and zirconium and their application as catalysts for 1-alkene polymerisation"</p> <p>JOURNAL OF ORGANOMETALLIC CHEMISTRY, ELSEVIER-SEQUOIA S.A. LAUSANNE, CH, vol. 665, no. 1-2, 3 January 2003 (2003-01-03), pages 135-149, XP004401808</p> <p>ISSN: 0022-328X</p> <p>page 136; compounds 1A-1C</p> <p>page 137; compounds 4A-5C</p> <p>tables 6,7</p> <p>page 143 - page 147; compounds 1A-1C, 4A-5C</p>	<p>1-4,6-8, 13,15, 17,18</p>
X	<p>WO 00/32653 A (NOVA CHEMICALS S.A; SPENCE, RUPERT, EDWARD, VON, HAKEN; KOCH, LINDA;) 8 June 2000 (2000-06-08)</p> <p>page 14 - page 19; example examples claims 1-10</p> <p>page 23; table 2</p>	<p>1-4,6-8, 17,19,20</p>
X	<p>EP 0 874 005 A (MITSUI CHEMICALS, INC) 28 October 1998 (1998-10-28)</p> <p>page 80; compounds L25, L29, L30</p> <p>page 120 - page 121; compounds A-25, B-25</p> <p>page 125 - page 128; compounds A-29, B-29, A-30, B-30</p> <p>page 145; examples 91-94, 107-111</p> <p>claims 1-28</p>	<p>1-7,13, 15,17-20</p>
X	<p>ISHII S. ET AL: "ZIRCONIUM COMPLEXES HAVING PHENOXY/CYCLOALKYLIMINE CHELATE LIGANDS FOR THE POLYMERIZATION OF ETHYLENE FOR VINYL-TERMINATED LOW MOLECULAR WEIGHT POLYETHYLENES"</p> <p>CHEMISTRY LETTERS, CHEMICAL SOCIETY OF JAPAN. TOKYO, JP, vol. 7, 2002, pages 740-741, XP009007498</p> <p>ISSN: 0366-7022</p> <p>the whole document.</p>	<p>1-7,13, 15,17-20</p>
X	<p>EP 0 990 664 A (MITSUI CHEMICALS, INC) 5 April 2000 (2000-04-05)</p> <p>synthesis examples 1-10</p> <p>examples 1-25</p> <p>claims 1-11</p>	<p>1-7,13, 15,17-20</p>

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X	<p>FELDMAN J ET AL: "ELECTROPHILIC METAL PRECURSORS AND A BETA-DIIMINE LIGAND FOR NICKEL(II)- AND PALLADIUM(II)-CATALYZED ETHYLENE POLYMERIZATION" ORGANOMETALLICS, WASHINGTON, DC, US, vol. 16, no. 8, 1997, pages 1514-1516, XP000979824 ISSN: 0276-7333 page 1516, left-hand column page 1515, right-hand column; compound 5</p>	1,2,7,17
X	<p>MARTIN A ET AL: "NEUTRAL AND CATIONIC GROUP 4 METAL COMPOUNDS CONTAINING OCTAMETHYLBIDBENZOTETRAAZAANNULENE (ME8TAA2-) LIGANDS. SYNTHESIS AND REACTIVITY OF (ME8TAA)MX₂ AND (ME8TAA)MX⁺ COMPLEXES (M = ZR, HF; X = Cl, HYDROCARBYL, NR₂, OR)" ORGANOMETALLICS, WASHINGTON, DC, US, vol. 17, no. 3, 1998, pages 382-397, XP000979823 ISSN: 0276-7333 page 384; compounds 3C,3D page 396</p>	1-5,7, 17,19,20
A	<p>EP 0 881 233 A (NOVA CHEM INT SA) 2 December 1998 (1998-12-02) comparative examples 5,7</p>	1-3,8,9, 17
X	<p>WO 96/13529 A (DSM N.V; VAN BEEK, JOHANNUS, ANTONIUS, MARIA; VAN DOREMAELE, GERARDUS,) 9 May 1996 (1996-05-09) examples I-LVI claims 1-15</p>	1-4,6, 11,12,17
X	<p>WO 02/070569 A (STICHTING DUTCH POLYMER INSTITUTE; KRETSCHMER, WINFRIED, PETER) 12 September 2002 (2002-09-12) preparations 1-6,9 examples 11-15,19-24,32-36</p>	1-4,6,7, 13,15, 17-20
X	<p>CA 2 243 726 A1 (NOVA CHEMICALS LTD) 21 January 2000 (2000-01-21) page 18 page 17 - page 31; examples 1-16 page 37; tables c1,c2 claims 1-17</p>	1-4,6,7, 17,19,20
X	<p>WO 02/16374 A (BOREALIS TECHNOLOGY OY; CAMPBELL, NEIL; ANDELL, OVE; MAARANEN, JANNE;) 28 February 2002 (2002-02-28) page 12 examples 5-10,12,13,15,16,19 page 43 - page 44; tables 1-5 claims 1-25</p>	1-4,6,7, 11,12,17
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 940 408 A (BAYER AKTIENGESELLSCHAFT) 8 September 1999 (1999-09-08) examples 3,6,8,10-12 examples 14-25 claims 1-13 -----	1-4,6, 10-12,17
X	EP 1 026 180 A (BASELL POLYOLEFINE GMBH) 9 August 2000 (2000-08-09) examples 1-8 claims 1-7 -----	1-4,6, 10,17
X	US 6 555 634 B1 (KLOSIN JERZY ET AL) 29 April 2003 (2003-04-29) examples 1-16 claims 1-8 column 11, line 15 - line 40 -----	1-4,6, 11,12,17
X	US 2003/004286 A1 (KLOSIN JERZY ET AL) 2 January 2003 (2003-01-02) examples 1-12 claims 1-10 column 9, paragraph 173 -----	1-4,6, 11,12,17
A	WO 97/02298 A (E.I. DU PONT DE NEMOURS AND COMPANY; JOHNSON, LYNDIA, KAYE; FELDMAN, JE) 23 January 1997 (1997-01-23) page 31 - page 32; examples 2,3 page 34 - page 37; examples 7-10,12,14 page 55 - page 69; examples 108,109,117-119,130-146 page 78 - page 87; examples 181,203-208 -----	1-5,7, 13,15-20
X	WO 98/46651 A (MASSACHUSETTS INSTITUTE OF TECHNOLOGY) 22 October 1998 (1998-10-22) examples 1-34 page 8 page 9, paragraph 2 -----	1-4,8, 13-15, 17,19,20
X	WO 98/45039 A (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; WATKIN, JOHN, G; CLICK, D) 15 October 1998 (1998-10-15) page 52 examples 11,14,15 claims 1-3 -----	1-20
P,X	US 2003/181317 A1 (TAGGE CHRISTOPHER D ET AL) 25 September 2003 (2003-09-25) column 12 - column 13 examples 1-5 claims 1-36 -----	1-4,6-9, 17,18

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6 (partly), 8-9 (partly), 17 (partly)

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is not defined as in claims 7, 10, 11, 13 or 15. Polymer obtainable with such a process.

2. claims: 1-6 (partly), 7, 8-9 (partly), 17 (partly)

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is as defined in claim 7. Polymer obtainable with such a process.

3. claims: 1-6 (partly), 8-9 (partly), 10, 12 (partly), 17 (partly)

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is as defined in claim 10. Polymer obtainable with such a process.

4. claims: 1-6 (partly), 8-9 (partly), 11, 12 (partly), 17 (partly)

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is as defined in claim 11. Polymer obtainable with such a process.

5. claims: 1-6 (partly), 8-9 (partly), 13, 14, 17 (partly), 18-20

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is as defined in claim 13. Polymer obtainable with such a process.

6. claims: 1-6 (partly), 8-9 (partly), 15, 16, 17 (partly)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Polymerisation process in the presence of an aluminium cocatalyst and a catalyst comprising a composition of a metal-organic reagent, a spectator ligand and optionally a hydrocarbylating agent where the spectator ligand is as defined in claim 15. Polymer obtainable with such a process..

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Information on patent family members

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